Scope of Work

For Project to Evaluate Water Augmentation Options to Assist Planning Areas within Arizona

Introduction

The Long-Term Augmentation Committee of the Governor's Water Augmentation Council wishes to complete an evaluation of water augmentation options to assist each of the 22 Planning Areas (see Table in **Attachment 1**) within Arizona. The purpose of this evaluation is to identify Planning Areas for which long term water supply augmentation is needed and determine which options, if any, may be available to them.

Task 1

For the Evaluation Factors listed in **Attachment 3**, utilize the guidance document provided to develop specific criteria for each Evaluation Factor.

Deliverable for Task 1

Written criteria that will be utilized by the consultant to complete the evaluation must be submitted in writing within 30 days of the initiation of work activities.

Task 2

For each Planning Area in the state (information provided in **Attachment 1)** complete an evaluation for each of the augmentation options listed in **Attachment 2** for the years 2020, 2030, 2040, 2050 and 2060, utilizing Deliverable 1. As needed to complete this evaluation, the data set developed by the Arizona Department of Water Resources (ADWR) titled, "WRDC Demand and Supply Numbers through 2060 Revised for Use by Governor's Water Augmentation Council Committees" should be utilized. This data set can be obtained electronically from ADWR upon request.

The evaluation work is expected to begin in March 2018 and will be completed no later than March 2019**.**

Deliverables for Task 2

Written status reports shall be provided on a quarterly basis. Reports shall be submitted by June 30, September 30, December 30, 2018.

A short document (not to exceed 50 pages) that presents the evaluation criteria for each option for each Planning Area by Planning Area. This document must be submitted by June 1, 2019. See **Attachment 4** for an example template. Suggestions from the consultant regarding this deliverable are welcomed.

A presentation at a meeting of the Long-Term Augmentation Committee not to exceed 60 minutes. This may be completed at any point between April 1, 2019 and June 30, 2019.

Task 3

For the Colorado Mainstem South, Colorado Mainstem North and Basin and Range AMAs Planning Areas, make a determination for each augmentation option regarding availability of that option during a shortage declaration on the Colorado River.

Deliverable for Task 3

This information may be provided separately or included within the written document as a deliverable for Task 2.

Attachment 1. Planning Areas and Pertinent Information

Arizona Planning Areas[1]

[1] The Planning Areas were developed by the Arizona Department of Water Resources' Strategic Vision for Water Supply Sustainability; pages 64-65

2014 Estimated Population by Planning Area

Planning Area	Total Estimated Population	Population in Incorporated Cities	% in Incorporated Cities
Apache	24033	0	0%
Arizona Strip	13105	6124	47%
Basin and Range AMAs	5416140	4570171	84%
Bill Williams	7476	0	0%
Central Plateau	93209	73099	78%
Cochise	40552	20663	51%
Colorado Main Stem North	120699	92658	77%
Colorado Main Stem South	220565	152211	69%
East Plateau	83752	50267	60%
Gila Bend	8315	1960	24%
Hassayampa/Agua Fria	21980	6602	30%
Lower Gila	11710	3083	26%
Lower San Pedro	14738	4454	30%
Navajo/Hopi	117399	7582	6%
Northwest Basins	69057	28620	41%
Roosevelt	45934	27223	59%
Upper Gila	43024	22625	53%
Upper San Pedro	89800	57861	64%
Verde	206443	132808	64%
West Basins	6561	0	0%
West Borderlands	5675	0	0%
Western Plateau	2320	0	0%

Incorporated Cities by Planning Area

Arizona Strip	COLORADO CITY
Arizona Strip	FREDONIA
Basin and Range AMAs	APACHE JUNCTION
Basin and Range AMAs	AVONDALE
Basin and Range AMAs	BUCKEYE
Basin and Range AMAs	CAREFREE
Basin and Range AMAs	CASA GRANDE
Basin and Range AMAs	CAVE CREEK
Basin and Range AMAs	CHANDLER
Basin and Range AMAs	COOLIDGE
Basin and Range AMAs	EL MIRAGE
Basin and Range AMAs	ELOY
Basin and Range AMAs	FLORENCE
Basin and Range AMAs	FOUNTAIN HILLS
Basin and Range AMAs	GILBERT
Basin and Range AMAs	GLENDALE
Basin and Range AMAs	GOODYEAR
Basin and Range AMAs	GUADALUPE
Basin and Range AMAs	LITCHFIELD PARK
Basin and Range AMAs	MARANA
Basin and Range AMAs	MARICOPA
Basin and Range AMAs	MESA
Basin and Range AMAs	NOGALES
Basin and Range AMAs	ORO VALLEY
Basin and Range AMAs	PARADISE VALLEY
Basin and Range AMAs	PATAGONIA
Basin and Range AMAs	PEORIA
Basin and Range AMAs	PHOENIX
Basin and Range AMAs	QUEEN CREEK
Basin and Range AMAs	SAHUARITA
Basin and Range AMAs	SCOTTSDALE
Basin and Range AMAs	SOUTH TUCSON
Basin and Range AMAs	SUPERIOR
Basin and Range AMAs	SURPRISE
Basin and Range AMAs	TEMPE
Basin and Range AMAs	TOLLESON
Basin and Range AMAs	TUCSON
Basin and Range AMAs	YOUNGTOWN
Central Plateau	FLAGSTAFF
Central Plateau	TUSAYAN
Central Plateau	WILLIAMS
Cochise	DOUGLAS
Cochise	WILLCOX
Colorado Main Stem North	BULLHEAD CITY
Colorado Main Stem North	LAKE HAVASU CITY
Colorado Main Stem South	PARKER
Colorado Main Stem South	QUARTZSITE
Colorado Main Stem South	SAN LUIS
Colorado Main Stem South	SOMERTON
Colorado Main Stem South	YUMA
East Plateau	EAGAR
East Plateau	HOLBROOK
East Plateau	PINETOP-LAKESIDE
East Plateau	SHOW LOW
East Plateau	SNOWFLAKE
East Plateau	SPRINGERVILLE
East Plateau	ST JOHNS
East Plateau	TAYLOR
East Plateau	WINSLOW
Gila Bend	GILA BEND
Hassayampa/Agua Fria	WICKENBURG
Lower Gila	WELLTON
Lower San Pedro	HAYDEN
Lower San Pedro	KEARNY
Lower San Pedro	MAMMOTH
Lower San Pedro	WINKELMAN
Navajo/Hopi	PAGE
Northwest Basins	KINGMAN
Roosevelt	GLOBE
Roosevelt	MIAMI
Roosevelt	PAYSON
Roosevelt	STAR VALLEY
Upper Gila	CLIFTON
Upper Gila	DUNCAN
Upper Gila	PIMA
Upper Gila	SAFFORD
Upper Gila	THATCHER
Upper San Pedro	BENSON
Upper San Pedro	BISBEE
Upper San Pedro	HUACHUCA CITY
Upper San Pedro	SIERRA VISTA
Upper San Pedro	TOMBSTONE
Verde	CAMP VERDE
Verde	CHINO VALLEY
Verde	CLARKDALE
Verde	COTTONWOOD
Verde	DEWEY HUMBOLDT
Verde	JEROME
Verde	PRESCOTT
Verde	PRESCOTT VALLEY
Verde	SEDONA

Attachment 2. Augmentation Options

AUGMENTATION OPTIONS		
Short Term Augmentation (10 yrs) ~Water Management~	**Voluntary In-State Exchanges**	**Long Term Augmentation (10-30 yrs)**
Conservation-Municipal	Groundwater	Ocean Desalination
Conservation-Ag	Groundwater/Surfacewater	Deep Aquifer Wells
Conservation-Industrial	Surface Water	Voluntary Out of State Importations
Aquifer Recharge-Urban Runoff	Reclaimed Water	Voluntary Out of State Exchanges
Aquifer Recharge-Treated Recycled Water	**Voluntary In-State Transfers**	Bi-national Options
Potable Reuse-Treated Recycled Water	Groundwater	
Non-Potable Reuse-Treated Recycled Water	Surface Water	
Aquifer Recharge-Imported Supplies	Reclaimed Water	
Weather Modification	**Brackish Desalination**	
Forest Restoration/Watershed Improvements		
Water Banking		
Regulatory Revisions		

Attachment 3. Evaluation Factors

Evaluation Factors					
Priority	**Benefiting Planning Areas**	**Levelized Cost per Acre Foot**	**Yield** (Acre Feet per Annum & Sustainability)	**Cost Efficiency**	**Ability to Finance** (Public, Private, PPP)
Potential Partners	**Environmental Considerations** (Partnership Opportunities)	**Reduced Energy Impact**	**Increased Energy Impact**	**Local Issues**	**Land Ownership Affecting Transmission Potential**
Permitting (Local, State, Federal)	**Ability to Increase Supply with Development**	**Renewability**	**Need for Legislative and Rule Changes**	**Existing or Planned Augmentation Projects**	**Impact on other PAs** (Financial, Environmenal, etc.)
Other Enviornmental, Legal, and Technical Constraints	**Time to Complete**	**Milestones** (Feasibility Analysis, Plans, & Implementation)			

Guidance to be used to develop criteria for Evaluation Factors

Priority: Rate this augmentation option as a high, medium, or low priority for the Planning Area based on the results of the other factors in this chart.

> Low: Water augmentation option is not feasible at any point in time for this Planning Area
>
> Medium: Water augmentation option may be feasible in the near future, but has either numerous or a few very critical constraints preventing its success
>
> High: Water augmentation option is feasible, obtainable, and affordable

Benefiting Planning Areas: Identify if other planning areas will be impacted and indicate whether the impact will be positive or negative. Briefly describe the nature of the impacts.

Levelized Cost per Acre Foot: Calculate the levelized cost (operation, maintenance, and capital) per acre-foot for the augmentation option.

Yield: Identify the yield in acre-feet. Identify the duration of the yield in years.

Cost Efficiency: Evaluate cost efficiency utilizing the following criteria:

Not efficient: product too expensive

Somewhat efficient: very few end users will pay the cost of the product

Efficient: product is affordable for the end user

Ability to Finance: Evaluate the ability of a single public institution to finance the water augmentation option utilizing the following criteria:

High: A single public institution within the Planning Area, such as a county or city, could finance the option.

Medium: Two to X entities would be paying the cost of the water augmentation option.

Low: This option is not possible to finance.

Partners: List the possible partnerships that could be established in support of the water augmentation option.

Environmental Considerations: Evaluate the environmental considerations to include:

a. Potential concerns related to air and water quality, impacts to listed species, etc.
b. Identify potential partnerships with non-governmental organizations

Reduced Energy Impact: Determine if the water augmentation option reduces the energy needs of existing water supply sources in the Planning Area. Rank from “high”, to “low”, to “none” the amount of energy conserved.

None: Does not reduce energy

Low: Less than ___ MW are conserved

High: More than ___ MW are conserved

Increased Energy Impact: Determine if the water augmentation option increases the energy requirements of the end users in the Planning Area. Rank from “high”, to “low”, to “none” the amount of energy required.

None: Does not require energy

Low: Less than ___ MW are required

High: More than ___ MW are required

Local Issues: Identify and list any applicable organizations, industries, or specific populations that may be negatively impacted by this water augmentation option.

Land Ownership Affecting Transmission Potential: List any possible land ownership controversies involved with this water augmentation option, or any nearby land-owners who would be negatively impacted by this water augmentation option.

Permitting: List any applicable permits at the local, state, and federal level that would be required for this water augmentation option.

Ability to Increase Supply with Development: Determine if the water augmentation option is flexible enough to increase its supply of the product to meet future development needs.

Renewability: Determine if the technology of the water augmentation option is flexible enough to be easily upgraded or coupled with other technological features to make it more efficient. List possible technologies that there could be.

Need for Legislative Rule Changes: List the rules or statutes that would require changes in order for the water augmentation option to become feasible.

Existing or Planned Water Augmentation Projects: Determine if the water augmentation option is already in existence or is already being developed within the Planning Area.

Impact on Other Planning Areas: List possible negative or positive impact on other Planning Areas that will be affected by the water augmentation option – financial, environmental, available water supply, social health, or otherwise.

Other Environmental, Legal, and Technical Restraints: Determine other environmental, legal, and technical factors not addressed in previous categories that need mentioning so that the water augmentation option could be a successful project.

Time to Complete: Estimate the timeline, from start to finish, for this water augmentation option to become a successful project given all the factors listed in the above categories.

Milestones: List the critical milestones that would need to be completed for this water augmentation option to become successful.

Attachment 4. Evaluation Table

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